

1. A method for enhancing the online experience of IP network users, comprising:
determining network conditions for data traffic content through the IP network;
and
selectively transforming the data traffic content at a proxy server coupled to a base station based upon the network conditions.
2. The method according to claim 1, wherein determining network conditions further includes determining a level of congestion at a radio link from the base station.
3. The method according to claim 2, wherein determining network conditions further includes identifying a first user requesting a disproportionate amount of bandwidth of the radio link.
4. The method according to claim 2, further including assigning a first threshold to the first user based upon the requested bandwidth.
5. The method according to claim 4, further including setting the first threshold to transform content of the data traffic requested by the first user to reduce congestion of the radio link.
6. The method according to claim 5, further including setting the first threshold based upon expected performance from a queueing model of the network.
7. The method according to claim 2, further including selecting a first threshold for aggregate user link congestion above which data traffic for the network users is transformed.
8. The method according to claim 7, further including selecting the first threshold based upon a queueing model of the network.

9. The method according to claim 2, further including selecting a first threshold for link congestion based upon quality of the data link as measured by data rate and/or packet error performance.
10. The method according to claim 9, further including selecting the first threshold based upon expected performance from a queueing model of the network.
11. The method according to claim 1, further including performing at least one content transformation technique selected from the group consisting of compression, content removal, transcoding, and version selection.
12. The method according to claim 1, further including selecting a control delay corresponding to a delay of a feedback signal from the base station of the radio link containing congestion level information to the proxy server.
13. The method according to claim 12, further including minimizing the control delay.
14. The method according to claim 12, further including locating the proxy proximate the base station to minimize the control delay.
15. The method according to claim 12, further including using a queueing model to model network performance based upon the control delay.
16. The method according to claim 1, further including establishing a plurality of thresholds for determining when the data content transformation is performed and not performed.
17. The method according to claim 16, further including selecting a plurality of content transformation levels corresponding to respective ones of the plurality of thresholds.

18. The method according to claim 1, further including establishing a first threshold level above which data transformation is performed.

19. The method according to claim 18, further including establishing a second threshold below which data transformation is not performed.

20. The method according to claim 1, further including establishing first, second, third and fourth states for determining whether content transformation is performed.

21. The method according to claim 20, further including transforming data in alternate ones of the states.

22. The method according to claim 19, further including adjusting the first and second thresholds according to a control delay corresponding to a delay associated with detecting traffic congestion greater than a predetermined threshold.

23. The method according to claim 1, further including generating a queueing model to evaluate performance tradeoffs in the network.

24. The method according to claim 23, wherein the performance tradeoffs include locating proxy servers proximate a variety of network components.

25. The method according to claim 23, wherein the performance tradeoffs include determining an optimal control delay.

26. The method according to claim 23, wherein the performance tradeoffs include determining optimal high and low thresholds for determining whether content transformation should be performed.

27. The method according to claim 23, wherein the tradeoffs include response time and image quality.

28. A wireless network, comprising:

a plurality of base stations; and

a proxy server in communication with a first one of the plurality of base stations for selectively reducing data content based upon a level of congestion in a radio link of the first one of the plurality of base stations.

29. The network according to claim 28, wherein the proxy server is proximate the first one of the plurality of base stations.

30. The network according to claim 28, wherein the network is a GPRS type network.

31. The network according to claim 28, wherein the proxy server can transform traffic content using one or more of data compression, transcoding, and content removal.